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Obituary

Lord Zuckerman (1904–1993)

Lord Zuckerman, who died on 1 April, 1993, aged 88, was perhaps the last survivor of those central to the foundation of Operational Research.

He was born Solly Zuckerman into a Jewish family in Cape Town, where his father ran a furniture and hardware business. Although an uncle was a prominent merchant (in 1926 the Zuckerman 10-storey building was the tallest in the city) his own immediate family were the 'poor relations'. They lived modestly and took in paying guests.

Solly was an able student, drawing perhaps on both his bookish father, and a mother who was 'an overwhelming taskmaster'. He started his training as a medical student at the University of Cape Town, and in 1926 transferred to continue it at University College Hospital in London. Apart from a three-month period in 1930, he was not to return to South Africa for nearly 50 years.

However, before he left South Africa he developed an interest in the biology and anatomy of baboons (his first paper was published in 1925) which led him away from the intended medical career. The result was to be classical works on the social life of monkeys and apes. He produced a veritable flood of scientific papers and monographs (over 90 between 1932 and 1939) and was drawn from monkey physiology and the links with behaviour towards research on hormones and reproductive cycles. (His simian subject matter, and his later military involvements, explain the title of his autobiography—*From Apes to Warlords*.) By the end of the decade he had held posts at the London Zoological Society (to which he was devoted, becoming Secretary in 1955, then President in 1977), Yale and Oxford, with a stint as Hunterian Professor at the Royal College of Surgeons.

After the war, and until 1968, he was Professor of Anatomy at Birmingham, but by then the pattern of his life had changed, and research became increasingly a side-show to his principal role in public affairs.

One strand of this public involvement can be traced back to his formation in 1931 of the 'Tots and Quots' dining club. (It was named from a mis-remembered Latin tag meaning 'so many men, so many opinions'.) Its membership, limited to 20, consisted largely of younger scientists—'young turks' as Zuckerman was later to describe them. (There were also non-scientists: Hugh Gaitskell, Richard Crossman and Roy Harrod for example.) The scientists, then relatively unknown, included Bernal, Haldane, Hogben, Huxley, Waddington. Zuckerman was to write in *From Apes to Warlords* 'Operational Research was, to a significant extent, the creation of our members'.

In its early days it was a stimulating society for exchanging scientific ideas and news, and for deepening scientific friendships. It was the product of Zuckerman's sociable gifts. In non-scientific fields he numbered Ben Nicholson, Barbara Hepworth, Tallulah Bankhead, Charles Laughton among his friends. But, from 1938 (the year of the Munich agreement) the Tots and Quots became the vehicle for a campaign to mobilize opinion behind the need for science to be effectively enlisted in preparations for the coming war. Meeting in private rooms at Soho restaurants, they invited a sequence of influential guests to join them—Lord Cherwell, H. G. Wells, the Joliot-Curies, Herbert Morrison, Admiral Nimitz . . .

The lack of official response led to increasing frustration, even desperation, at the country's lack of preparedness. A meeting in 1940 with Allen Lane (of Penguin Books) led to a decision to publish their criticism and proposals as a book. Masterminded by Zuckerman, the typescripts (by 25 scientists) were ready in 11 days, and *Science in War* was published within the month. More than 20 000 copes were sold, and it had an immediate impact. One of its sections contains perhaps the first public description of operational research—as examples of what science had already achieved in the conduct of the war.

With these activities Zuckerman was already launched on that involvement with science policy which was to be a major preoccupation after the war. More immediately, however, it led to one of the strands of wartime operational research. Zuckerman, together with J. D. Bernal, had taken the lead in contesting government policy on air raid precautions. From October 1939 they conducted experiments on the effects of blast and shock waves on monkeys and goats—eventually joining the monkeys in the trenches. Before long, the work was extended to include field surveys of the results of bombing incidents. By the end of the war Zuckerman's team, based in the Department of Anatomy at Oxford, was studying the biological effects of practically every kind of weapon in a wide range of circumstances. This work was of great practical importance in the design of protective equipment. It was also psychologically important, in showing that protection against the effects of air-raids was not so hopeless as had been assumed.

The team work with Bernal continued for much of the war. Bernal was particularly responsible for initiating the systematic study of the effects of German bombing of British cities, involving a large group of observers to record the relevant data. This work had a bearing on offence as well as defence. Of particular note was the investigation by Bernal and Zuckerman of the effects of air-raids on Birmingham and Hull, commissioned by Professor Lindemann (Lord Cherwell), Churchill's scientific advisor. Cherwell made very selective use of the information in the report to support the argument for 'area bombing' of the populations of German cities, rather than strategic military and industrial targets. The Tizard–Lindemann dispute on this issue was one of the key practical and moral controversies of the war, which still reverberates.

In April 1942 Bernal and Zuckerman were recruited by Lord Mountbatten at Combined Operations to work on the planning of operations involving army, navy and air force. This work took them to North Africa where a quarrel ended their partnership. Zuckerman stayed in the Mediterranean theatre for most of 1943. His work included the study of the effectiveness of air operations against Tripoli and Tobruk, and then proceeded to active involvement in the planning of operations against Pantelleria (a small scale 'laboratory experiment') and Sicily.

In January 1944 Zuckerman returned to the UK as scientific advisor on Leigh-Mallory's planning staff for OVERLORD. His war service ended with a return to the analyses of the effects of bombing—helping to form the RAF Bombing Analysis Unit, and then directing the British Bombing Survey Unit. This investigated on the ground the outcome of the Strategic Air Offensive against Germany—and its highly critical report on bombing accuracy and its effect on Germany's ability to pursue the war made him quite unpopular with the Air Staff.

After the war, Zuckerman returned to academia, and to Whitehall. His war-time work (often shared with Bernal) has been seen as less mainstream, for example, than the OR work on the deployment of radar, the setting of depth charges and the size of convoys carried out by the Army Operational Research Group and Coastal Command. However, it shared key features of approach, which could be loosely summarized as the analysis, by scientists with a conventional training, of operations and data far removed from laboratory conditions, in close relationship with those responsible for the conduct of operations. Certainly it was seen as part of the same broad movement at the time, not least by Zuckerman.

In the immediate post-war period Zuckerman maintained some involvement with OR through his membership of the Advisory Committee set up to oversee the new (and short lived) unit at the Ministry of Works. However, he was soon a key player on a host of Government Committees—he had membership of at least 40 official bodies over the period 1946 to 1959, most of them extending over a number of years.

The list is extraordinary for a man who was not a salaried government servant. There were committees of the Ministries of Agriculture, Fuel and Power, Labour, Supply and Works, and the Air Ministry; there was the Ordnance Board, the Agricultural Research Council, the Aeronautical Research Council; there was membership of the Barlow Committee on Future Scientific Policy, the Committee on Scientific Manpower, UN Conferences on Natural Resources and on World Population, NATO committees, OEEC/OECD committees . . . The pattern was to continue through to the 1970s.

One key role was as Vice-Chair of the Advisory Committee on Scientific Policy from 1948 to 1964. By 1960 he was Scientific Advisor to the Ministry of Defence, and in 1964 became Chief Scientific Advisor to the Government. Both were effectively full-time jobs, although he found some time to visit the University of Birmingham where he was still Professor of Anatomy. Even after he officially retired from his Government post in 1971, he continued to keep a room in the Cabinet Office until at least 1984—a quite unusual privilege. He called himself government's 'continuity man' in Whitehall.

His decades in and around government, his smooth manner, his marriage to the daughter of Lord Reading, his panoply of honours might give the impression, at least in later life, of the ultimate organization man. Yet he was a man of strong convictions with at least a radical tinge, which surfaces time after time in his long career. The 'young turks' of the Tots and Quots were, by and large, on the left; and in 1948 he became a member of the Labour Party's Science Policy committee. His initial war-time concentration on civilian protection was consistent with his later opposition to 'Bomber' Harris's predilection for saturation bombing of German towns. His post war opposition to the use of nuclear weapons was such that, despite his official positions, he was never told of the Government's decision to press ahead with the development of a British Bomb. After his retirement and in his eighties, when freed from official restraints, he returned to the fray, writing and speaking against the proliferation and escalation of weapon systems like the 'Star Wars' project. He was outspoken against the role of scientists in pushing politicians into these expensive and dangerous adventures.

In later life Zuckerman kept a fatherly interest in operational research—although sometimes, in respect of its wilder theoretical shores (as he put it), it was a jaundiced eye. In 1964 he contributed a reminiscence on the origins of our subject to the *Operational Research Quarterly*, and in the 1970s he was a founding father of the International Institute for Applied Systems Analysis. He became a Companion of Operational Research in 1985. And it was fitting that when the Operational Research Society in 1987 celebrated the 50th anniversary of OR at a commemorative lunch at the Savoy, it was Solly Zuckerman who was the guest of honour.

JONATHAN ROSENHEAD